

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Revision of Part 15 of the Commission's)	
Rules Regarding Ultra-Wideband)	ET Docket 98-153
Transmission Systems)	

COMMENTS OF KROHNE AMERICA INC.

Krohne America Inc. ("Krohne"), by its attorneys, hereby files these Comments in the above-captioned proceeding. Krohne is a leading worldwide manufacturer of tank level radar technology and will be directly affected by the outcome of this proceeding.

Background

Krohne is a manufacturer of devices used to measure tank levels predominantly in the liquid processing industries. Krohne's device, the BM70 uses a frequency modulated signal that is swept between 8.5 and 9.5 GHz to perform continuous monitoring, recording and control of liquid levels. Typically the devices are used in the chemical, petrochemical, paper, food, pharmaceutical and similar industries where conventional measuring methods either will not work or are unreliable or inaccurate due to difficult application conditions. The frequency range was chosen after considerable study of such factors as the dielectric constants of the typical liquids being measured as well as the nature of the perturbations of the liquid surfaces. It permits the measurement of often turbulent liquid level surfaces in an agitated chemical reactor, for example. However, because the band of operation includes two restricted bands,

for the past eight years, Krohne has had to undergo the regulatory burden of obtaining and maintaining licenses for its customers under Part 90 of the Commission's rules.¹

Not surprisingly, there has never been a single reported case of interference from a Krohne device. Nor is it likely to expect there will ever be a case of interference from any of its measurement devices that operate in enclosed steel tanks. They operate at very low power levels such that their emissions, when measured outside the tank, are magnitudes below the Commission's Class B limits.² If the Commission were to prescribe the ideal emitter in the 8.5 to 9.5 GHz band (or indeed, any band), this might be it – a low power RF emitter in a closed steel tank. And if ever there was a device deserving of deregulation, this is it. In crafting regulations in this docket, the Commission has the opportunity to lift the regulatory yoke to permit the unlicensed Part 15 operation of the Krohne devices.

The Krohne devices should be considered Ultra Wide Band

The Commission's theory in proposing to allow UWB emissions in the restricted bands is that, 1) it is too difficult to transmit over wide ranges without including the restricted bands; 2) UWB technology appears to be in the public interest; and 3) interference to the restricted bands from low power UWB devices is probably negligible. Krohne agrees; moreover, this reasoning applies squarely to Krohne's level measuring devices, whether or not the Commission determines to include them in its technical definition of UWB. As we show

¹ Krohne's regulatory path has been tortuous. Pursuant to various waivers obtained with the consent of NTIA, each installation of a Krohne device may be permitted in the first instance by a conditional site license granted to the tank customer and filings by Krohne for both a waiver and Part 90 radio license application for the site. Unlike its unlicensed competitors who operate non-swept emitters under Part 15, Krohne must prepare and file these applications, request regular renewals of licenses and pay annual regulatory fees. Over the years, this regulatory regime has cost Krohne tens of thousands of dollars.

²Emissions from the BM70 are measured at 12-15db below the Part 15 limits – virtually "in the noise."

below, however, with minor modifications to its proposals, the Commission can and should fashion a UWB definition that will include the Krohne measurement devices.

The Commission's Proposed Bandwidth Definition

The Commission has tentatively defined a UWB device as “any device where the fractional bandwidth is greater than 0.25 or occupies 1.5 GHz or more of spectrum.”³ It is apparent that the Commission’s choice of 1.5 GHz was somewhat arbitrary and loosely based on its review of the various comments submitted in the *Notice of Inquiry* in this proceeding. As the Commission noted, “most” of the UWB systems that have been brought to its attention employ fundamental emissions greater than 1.5 GHz. But surely, the Commission could have chosen virtually any very wide bandwidth. For instance, it could have chosen 1 GHz as an alternative minimum bandwidth and still have been reasonably assured that its other technical proposals would prevent unreasonable interference from UWB emitters. The Commission’s definition was designed, in part, to “... avoid situations where devices operating at several gigahertz and above might unnecessarily use wide bandwidths simply to qualify as a UWB device,” and, in part, to account for the tiny universe of devices of which the Commission was aware at the time.⁴ As noted above, the Krohne devices are designed to operate between 8.5 and 9.5 GHz, surely a large enough bandwidth to qualify for UWB treatment. The spectrally efficient Krohne devices and others like it should not be precluded from UWB designation based on an arbitrary determination of bandwidth. We urge the Commission to either lower the total bandwidth figure or, in the alternative, announce a flexible range of bandwidths it will consider favorably for UWB designation.

³ *Notice of Proposed Rulemaking* in ET Docket 98-153, Para. 21, released May 11, 2000

⁴ *id.*

The Proposed Rules Should Not Penalize Swept Frequency Devices

In its *Notice* the Commission acknowledged that other types of modulation, specifically linear sweep FM, could be employed to produce UWB equipment but requested comment on whether its definition of UWB devices should be limited to devices that only used pulsed emissions. The Commission explained this admittedly conservative approach by suggesting that it had insufficient information to propose measurement procedures and limits for swept frequency devices. Surely, this will come as a surprise for manufacturers and test laboratories throughout the world that have been measuring swept frequency devices for years simply by stopping the sweep at various desired frequencies and taking peak or average measurements – pursuant to Commission requirements.⁵ Indeed, measurements may be obtained even without stopping the sweep if the frequency ramp rate is slow enough.

Perhaps the Commission’s reticence to take this common approach for UWB devices is because they will be sweeping through, rather than just pulsing in, restricted bands. Perhaps, although not articulated in the *Notice*, the Commission has a heightened sensitivity to the measurement procedure’s inability to reasonably predict interference to receivers in restricted bands.⁶ But merely taking multiple measurements in the restricted bands themselves, can alleviate this problem, if there is one. In addition, the arcana of swept measurement theory might seem of less moment if the Commission were to take into account the type of “victim” receivers likely to be found in these bands. Krohne devices, for instance, operate between 8.5 and 9.5 GHZ, an area of the spectrum primarily inhabited by high power radiolocation devices. To receivers designed to operate in this environment, it is hardly likely that the enervated,

⁵ See Section 15.31(c) of the Commission’s Rules.

⁶ The reason for any heightened concern is certainly not intuitive. Depending on the rate of sweep versus the pulse repetition frequency, there is no reason to believe that a swept frequency device is any more of an interference threat than a pulsed device.

refugee signals that manage to penetrate the confines of a steel tank would pose a problem.⁷ Under such circumstances, the Commission cannot and should not categorically exclude swept frequency devices from UWB designation.

The Commission Must Adopt a Flexible Approach

The Commission is to be commended for striking a blow for spectrum efficiency by starting the process to “introduce” UWB systems. Still, as the *Notice* makes clear, the Commission is forced to base its decision making process largely on the few systems that exist today and on whatever technical studies it will have at its disposal. It is likely that these studies will continue to be submitted for some time. Thus, even optimistically, this proceeding can be expected to stretch over more than a year. During this period, technology will evolve, new and compelling uses for UWB technology will be found, and priorities may change. To some extent, the Commission will be shooting at a moving target. Whatever decisions the Commission makes, therefore, should contain within them the seeds of change and flexibility. To this end, Krohne makes the following recommendations:

- To the greatest extent possible, the Commission should determine the types of UWB activities that pose the least interference concerns and issue interim Orders permitting their deployment, under whatever conditions are deemed suitable.
- During the pendency of this proceeding (or its various stages) the Commission, with the advice of NTIA should continue to grant selected waivers of its Part 15 regulations to permit the operation of various types of UWB devices. These waivers should be conditioned on the regular submission of data to the Commission in order to give the Commission more practical experience on which to base final judgments in the proceeding.
- The Commission should grant the Chief of the Office of Engineering and Technology delegated authority to waive the Part 15 regulations to permit the operation of technologies that may not meet any particular definition of UWB chosen by the Commission, but which pose no threat of interference in the restricted bands.

⁷ In non-engineering parlance, such signals could best be described by the useful concept of “a drop in the ocean.”


Conclusion

The case of the Krohne tank level measuring devices is a paradigm of the unintended consequences of well-intentioned regulation. For uniquely historic reasons, the United States has stood alone in the world with its concept of the Part 15 "restricted bands." Now that it has determined, via this proceeding, to open these bands to products that, by any reasonable measure, pose no threat of interference to anyone, it must be careful not to make arbitrary distinctions which favor one technology over another.

In this proceeding, the Commission has the opportunity to designate the Krohne devices as UWB emitters and grant Krohne the regulatory status it deserves. Surely a device operating across a gigahertz of bandwidth, or perhaps even less, can reasonably be defined as Ultra Wide Band and just as surely, given its operating environment, the fact that Krohne devices employ swept, rather than pulsed transmissions to traverse this bandwidth should not be an impediment to reasonable regulation.

At the very least, Krohne urges the Commission to create a flexible scheme permitting of reasonable waivers speedily processed under delegated authority in order to avoid a Report and Order that will surely run the risk of becoming outdated even by the date of its adoption.

Respectfully submitted,
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